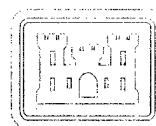


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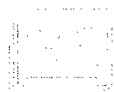
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Engineer Research and
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Development of a Pilot Interactive Training Program for ATTACC Users

Gwyn L. Howard, Michael L. Denight, Alan B. Anderson,
and James Cookas

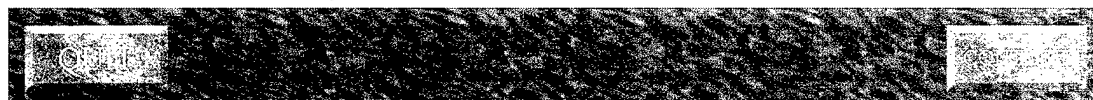
March 2001



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Foreword

This study was conducted for Commander, U.S. Army Corps of Engineers and the U.S. Army Training Support Center (ATSC) under A896 "Base Facilities Environmental Quality"; Work Unit CNC-T091, "Development of an Interactive Training Program for ATTACC Users." The technical monitor was Dr. William D. Severinghaus.

The work was performed by the Land and Heritage Conservation Branch (CN-C) of the Installations Division (CN), Construction Engineering Research Laboratory (CERL). The CERL Principal Investigators were Mr. Michael L. Denight and Ms. Gwyn L. Howard. The technical editor was Gloria J. Wienke, Information Technology Laboratory. Mr. Stephen E. Hodapp is Chief, CEERD-CN-C, and Dr. John T. Bandy is Chief, CEERD-CN. The associated Technical Director was Dr. William D. Severinghaus, CEERD-CV-T. The Acting Director of CERL is Mr. William D. Goran.

CERL is an element of the U.S. Army Engineer Research and Development Center (ERDC), U.S. Army Corps of Engineers. The Director of ERDC is Dr. James R. Houston and the Commander is COL James S. Weller.

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Contents

Foreword.....	2
List of Figures	4
1 Introduction.....	5
Background	5
Objective.....	5
Approach	5
Mode of Technology Transfer	6
The ATTACC Tutorial.....	6
References.....	27
CERL Distribution	28

List of Figures

Figures

1	Opening screen of the ATTACC tutorial.	6
2	Main index page for the tutorial.	7
3	Introduction screen.	8
4	Section 1 objectives.	9
5	Section 1 overview.	9
6	General introduction screen with highlighted ITAM definition box.	10
7	Decision support tools that form ATTACC.	11
8	ATTACC structure outline.	12
9	Section 2 screen.	13
10	Introduction to Erosion Status screen.	14
11	RUSLE equation used for determining soil loss.	15
12	Data availability for RUSLE.	16
13	Land Condition Curve.	17
14	Land Condition Curve shift.	18
15	Summary of LCM screen.	19
16	RFMSS opening screen.	20
17	Parts of RFMSS system.	21
18	MIM screen.	22
19	Weblink screen for additional help.	23
20	AIM screen.	24
21	AIM Land Condition screen example.	25
22	AIM Training Load screen example.	26
23	AIM Land Maintenance screen example.	26

1 Introduction

Background

The Army Training and Testing Area Carrying Capacity (ATTACC) methodology is the Integrated Training Area Management (ITAM) standard for estimating training land carrying capacity by relating training load, land condition, and land maintenance practices. Various decision support tools have been developed to simplify and automate the ATTACC methodology. These decision support tools include the Workplan Analysis Module (WAM), ATTACC Integration Module (AIM), ATTACC functions of the Range Facility Management Support System (RFMSS), and Land Condition Module (LCM).

Objective

The objective of this work was to develop an interactive computer-based training program for users of the ATTACC decision support tools. This software manual documents the development of the ATTACC tutorial program.

Approach

Authorware 5.1,^{*} which uses object-oriented programming, was used in the development of this tutorial. Authorware is a program that allows the author to assemble multimedia into a functioning and comprehensive package for delivery via the Web, LANs, and CD-ROMs. It is the language in which many current and future models are being programmed; communication between programs would be easily accomplished.

^{*} Authorware is a product of Macromedia, 600 Townsend Street, San Francisco, CA 94103.

Mode of Technology Transfer

The computer program documented in this report allows installations to implement the ATTACC methodology. The information in this report was provided to Army personnel responsible for ATTACC implementation including the U.S. Army Environmental Center (AEC), the U.S. Army Training Support Center (ATSC), and the Engineer Research and Development Center (ERDC).

The ATTACC Tutorial

To manually install the ATTACC tutorial CD-ROM, begin with the following steps.

1. Insert the CD-ROM into the CD-ROM drive.
2. Open the CD-ROM drive on your computer screen.
3. Double click on the ATTACCtutorialv1.exe file.
4. The introduction screen will appear and you may press the "Continue" button to proceed through the rest of the program. Figure 1 illustrates the opening screen.

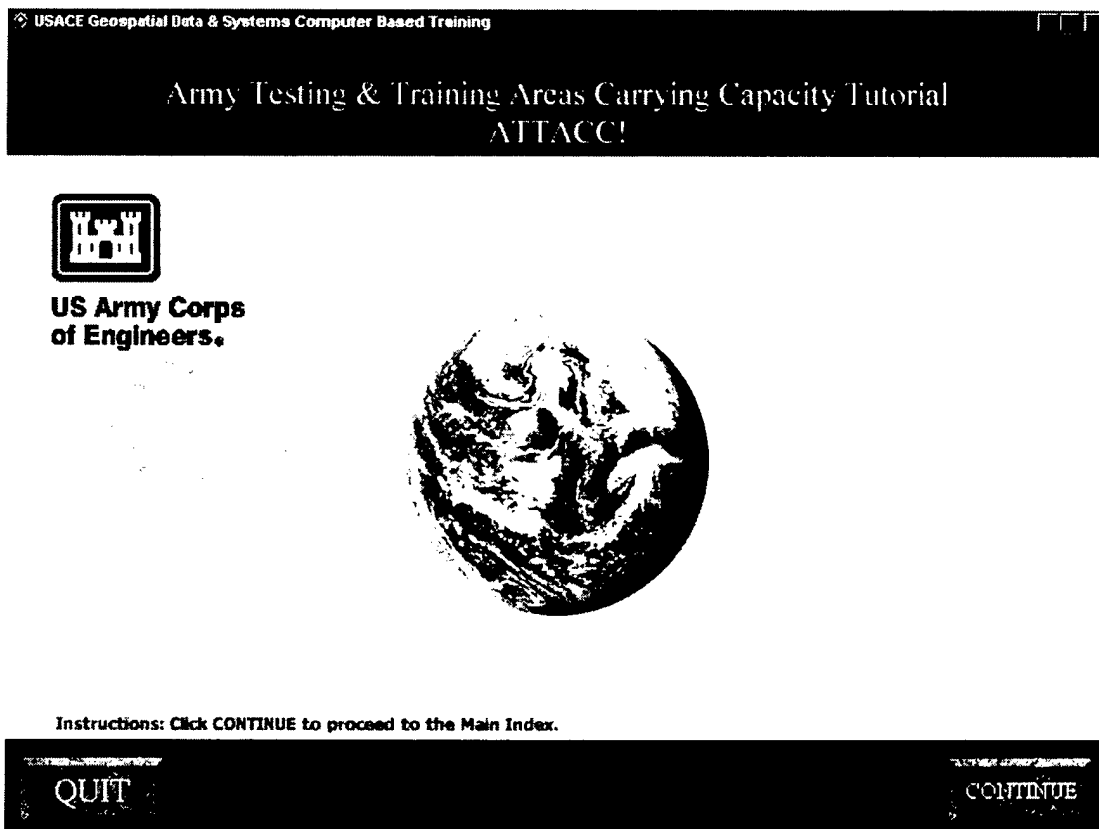


Figure 1. Opening screen of the ATTACC tutorial.

By clicking on the "Continue" button, the following screen will appear (Figure 2). This is the main index page for the tutorial.

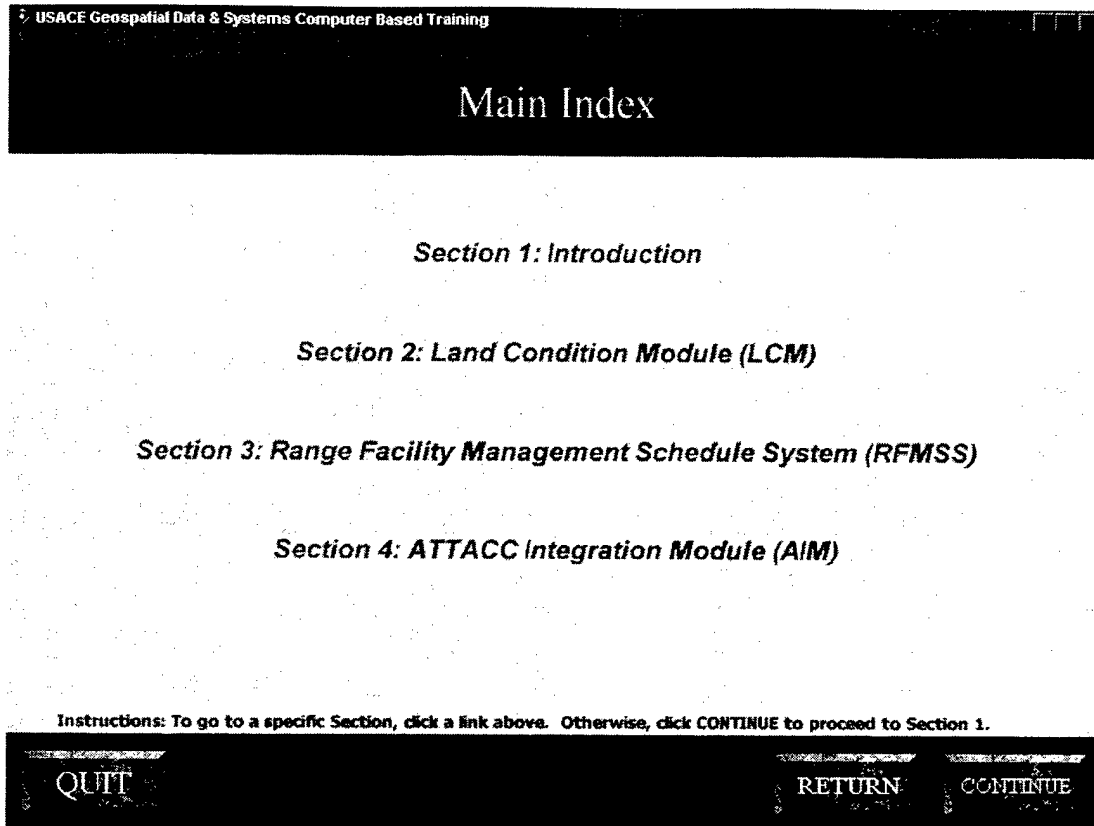


Figure 2. Main index page for the tutorial.

The “Section 1: Introduction” selection (Figure 3) provides a screen that addresses the overall organization of the tutorial. It provides information on where the objectives and summaries for each section are located, and how to make use of the “Help” menus and pages.



Hello and welcome to the first section of this computer-based training application! This program will cover many different aspects of the ATTACC Decision Support Tool. Included in these topics will be in-depth discussion of what is ATTACC, how it can benefit your program, where do you obtain the components to run the system, and the definitions associated with these components.

Each section begins with an **Objectives** page which contains basic concepts that will be covered within the section. When you reach the end of a section, a **Summary** page will appear. Here, important terms and ideas will be reiterated.

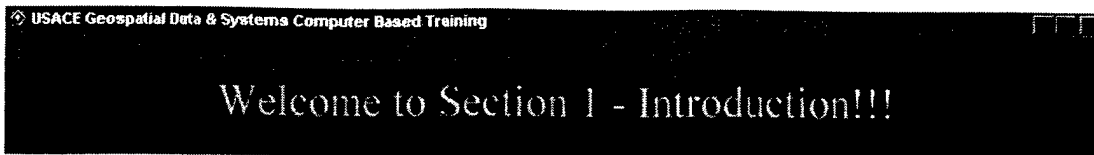
If, at any time, you become confused with the user interface of this program, feel free to consult the help pages. To do so, click the **Help** menu and then click on **Help Pages...** These pages will provide information on the functions, features, and fonts available in the program.

If you feel like quitting the module without completing it, your progress will be automatically saved and when you restart the application, the last page you visited will be displayed.



Figure 3. Introduction screen.

Section 1 provides an overview of what ATTACC is and how it can benefit Land Managers (Figures 4 and 5).



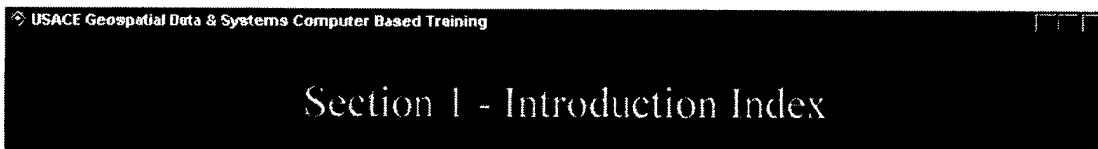
SECTION 1 OBJECTIVES

Important Concepts Introduced in this Section:

- Through this section you'll be able to gather a better idea of what ATTACC is and how it has been developed.
- You'll also gain a better perspective on how it can benefit you as either a Land Manager or a Trainer and your individual programs.



Figure 4. Section 1 objectives.



Topic 1: What is ATTACC?

Topic 2: How does it benefit me?

Instructions: To go to a specific Topic, click a link above. Otherwise, click NEXT to proceed to Topic 1.

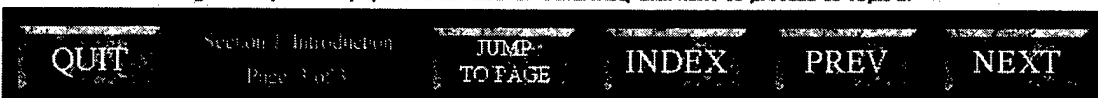


Figure 5. Section 1 overview.

Figure 6 shows a screen that provides a general introduction to the concepts of ITAM and ATTACC. Those items highlighted in red text on the screen can be clicked on to generate a definition as shown in the following.

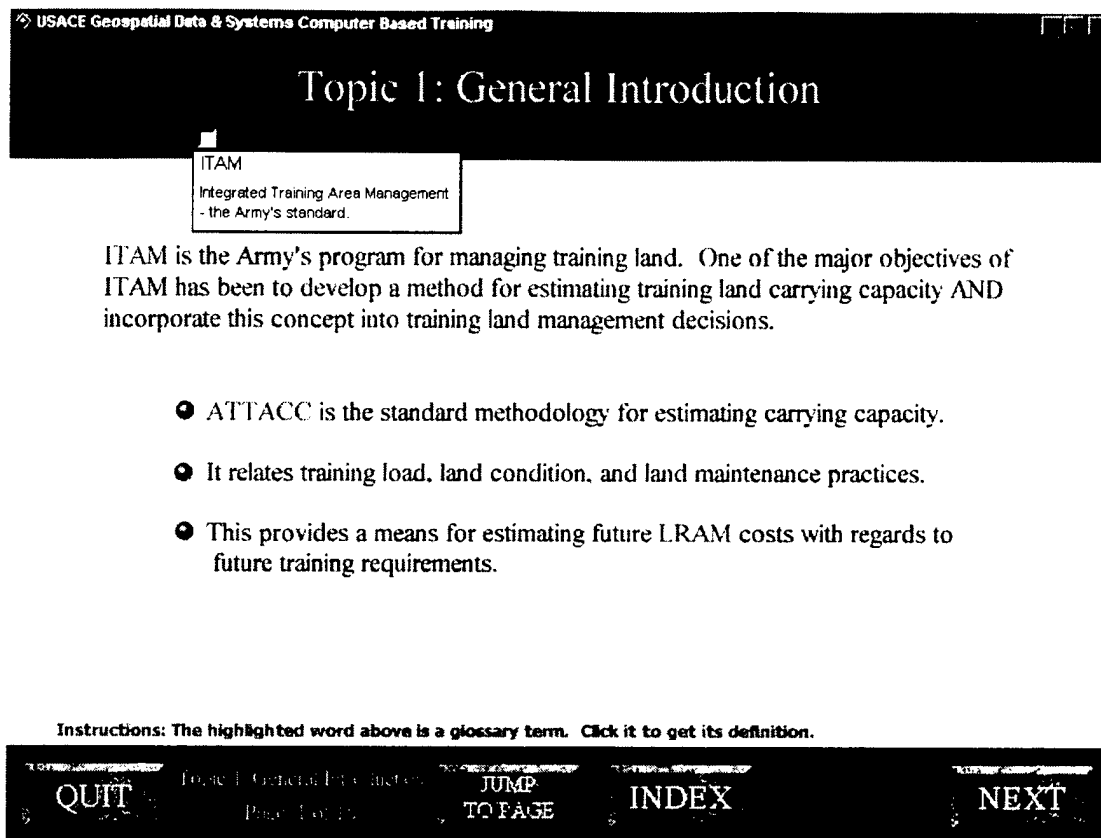


Figure 6. General introduction screen with highlighted ITAM definition box.

The screen shown in Figure 7 outlines the suite of decision support tools used within the ATTACC methodology.

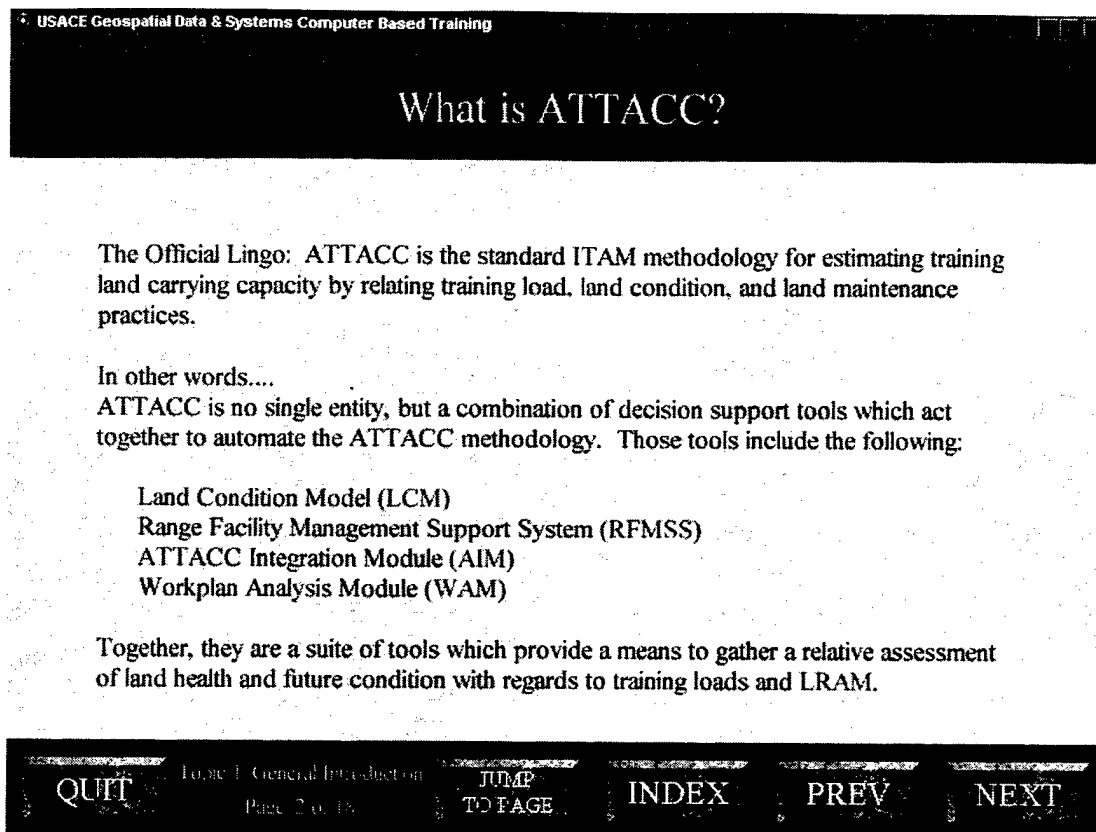


Figure 7. Decision support tools that form ATTACC.

The screen shown in Figure 8 provides a conceptual framework for the ATTACC tools and a definition for each. The tools are outlined in red on the screen and are accompanied by a definition for that specific tool. The example provided is for the RFMSS.

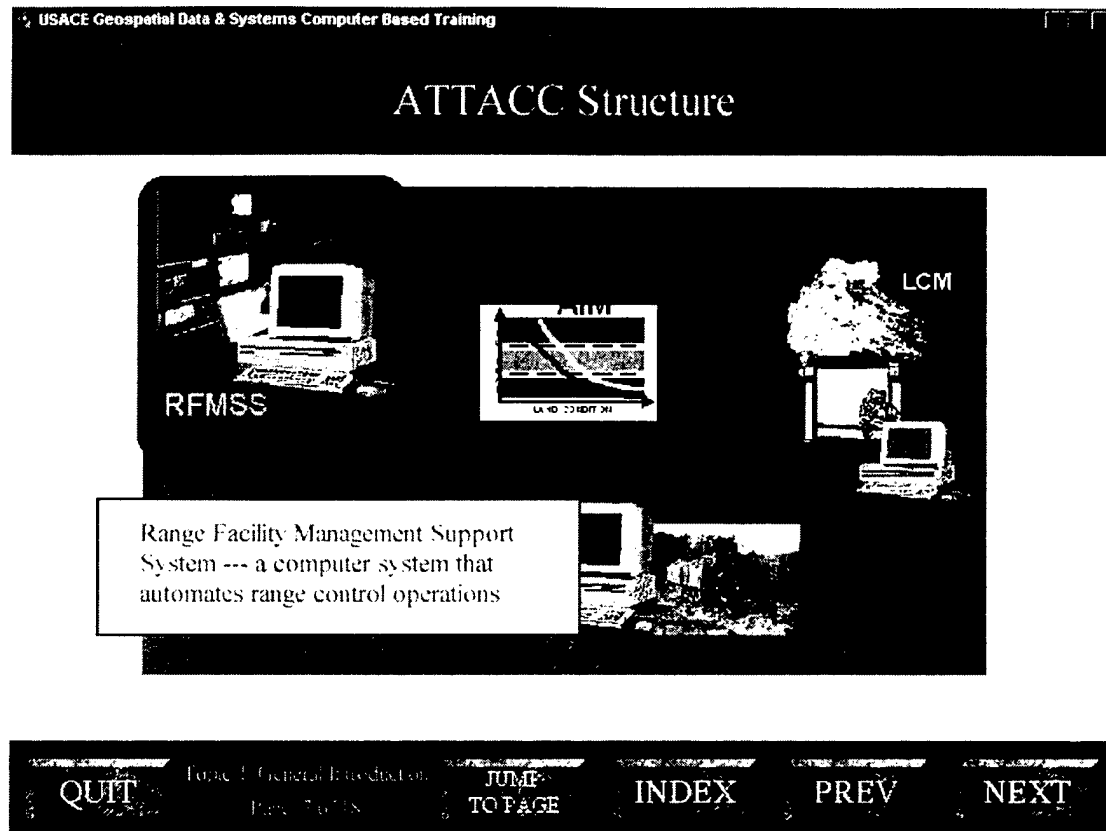


Figure 8. ATTACC structure outline.

Within Section 2 (Figure 9), the Land Condition Module is introduced. The main topic being addressed is the concept of Erosion Status (ES) (Figure 10). This topic area is discussed in detail due to the important part it plays in the ATTACC methodology; it determines acceptable soil loss levels for a given parcel of land.

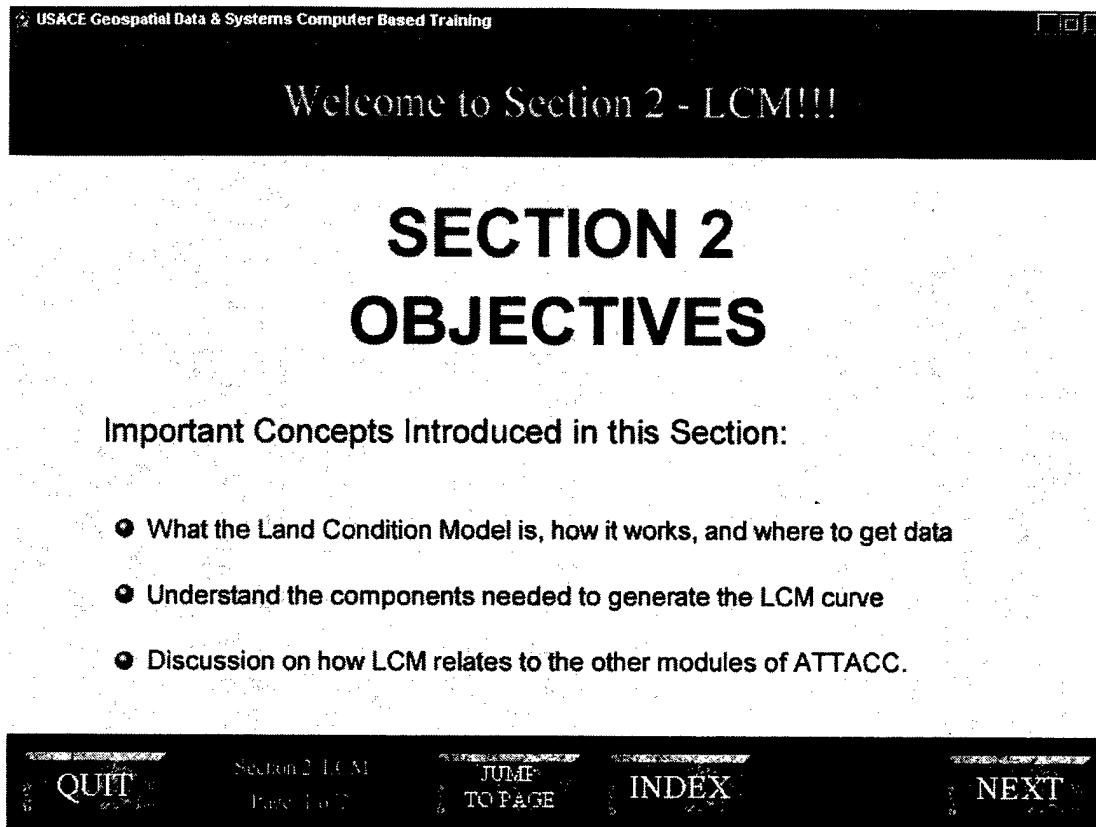


Figure 9. Section 2 screen.

Figure 10 outlines the method for calculating land condition in terms of Erosion Status and the factors that are taken into consideration.

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Topic 1: Erosion Status

What's LCM and How's it Work?

- LCM measures land condition in terms of Erosion Status (ES) through the use of the Revised Universal Soil Loss Equation (RUSLE).
- RUSLE factors in the following land conditions:
 - Percent vegetative cover
 - Climate
 - Soil Type
 - Length/Slope (a topographic derivative)
 - Conservation Practice Factor

QUIT Topic 1: Erosion Status JUMP TO PAGE INDEX NEXT

Page 1 of 10

Figure 10. Introduction to Erosion Status screen.

Figure 11 illustrates the Revised Universal Soil Loss Equation (RUSLE) used for calculating Erosion Status.

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How does RUSLE work?

The formula for RUSLE is: $ES = (R \times K \times LS \times C \times P) / T$ Where.....

- ES = Erosion Status
- R = Climatic Factor
- K = Soil Erodibility Factor
- LS = Topographic Factor
- C = Vegetative Cover
- P = Conservation Support Practices
- T = Soil Loss Tolerance

QUIT Topic 1 Erosion Status Page 2 of 10 JUMP TO PAGE INDEX PREV NEXT

Figure 11. RUSLE equation used for determining soil loss.

Data for input to RUSLE can be obtained in a variety of places, as illustrated by Figure 12.

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Where do I get this data?

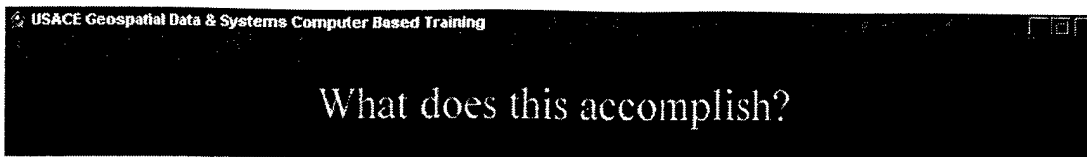
Data for ATTACC is generally available through the following:

- R Factor (a constant) - published isoerodent maps
- K and T Factor maps - digitized NRCS soils survey maps
- LS Factor map - derived from DEM, DTED, or LCTA data
- C Factor map - use LCTA data extrapolated across the installation by remotely sensed data, vegetation maps or soils maps
- P Factor (a constant) - Subject Matter Experts and published values
- Available Training Lands map - created by omitting restricted areas (i.e. bodies of water, impact areas, etc)
- Training Areas map - map used for scheduling training in the RFMSS program

QUIT Top of Page / Back to Status JUMP TO PAGE INDEX PREV NEXT

Figure 12. Data availability for RUSLE.

ES is used to determine the Land Condition Curve illustrated in Figure 13.



- This allows ATTACC to generate a Land Condition curve.

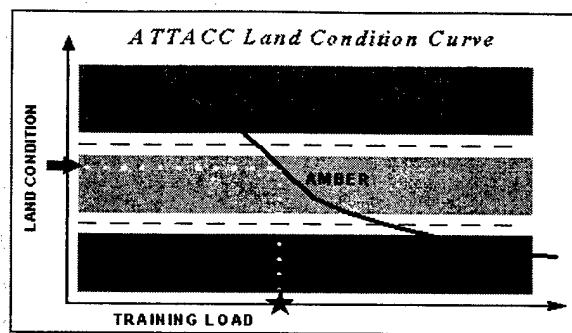


Figure 13. Land Condition Curve.

As Figure 14 illustrates, the Land Condition Curve can be shifted toward a more sustainable condition to allow a greater training load with appropriate Land Rehabilitation and Maintenance (LRAM) inputs.

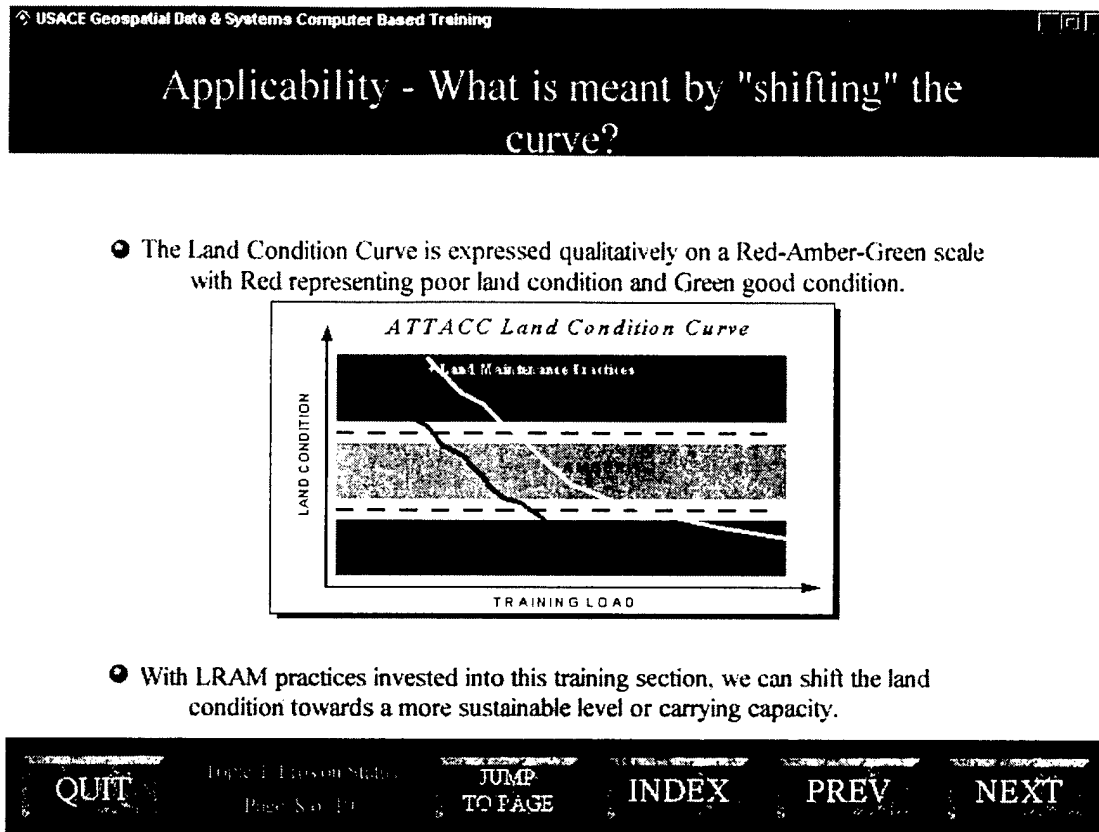


Figure 14. Land Condition Curve shift.

Determining ES through the use of the LCM is integral to the ATTACC methodology. Figure 15 summarizes a few of the more important points addressed by this system.

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Summary of LCM

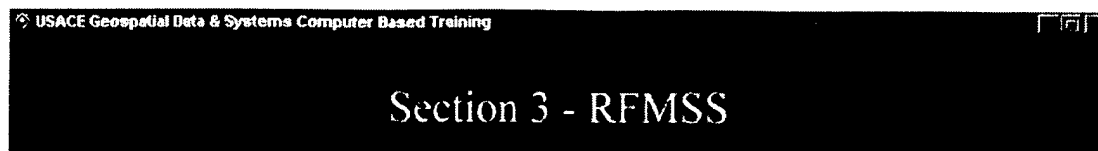
- LCM is the heart of ATTACC - it's an ArcView GIS-based software application which estimates changes in land condition associated with mission activity.
- It is used by LCTA/GIS coordinators to synthesize natural resources data layers and produce a land condition curve.
- LCM is a necessary input for the ATTACC Integration Module (AIM).

Instructions: Click NEXT to proceed to Section 3 or click INDEX to jump to another Topic.

QUIT TOPIC 1: Overview Status JUMP TO PAGE INDEX PREV NEXT

Figure 15. Summary of LCM screen.

The RFMSS is another key component to the ATTACC methodology. RFMSS (Figure 16) is primarily focused on tracking and calculating the impact of Maneuver Impact Miles (MIMs).



Topic 1: Overview of RFMSS and its Components

Topic 2: Understanding MIMs

Instructions: To go to a specific Topic, click a link above. Otherwise, click NEXT to proceed to Topic 1.

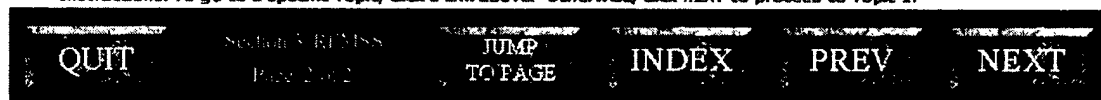


Figure 16. RFMSS opening screen.

The topic of RFMSS was divided into several parts (Figure 17).

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Topic 1: RFMSS Overview

Part 1: RFMSS Capabilities

Part 2: RFMSS ATTACC Functions

Part 3: Basic Units of Measurement

Part 4: Benefits and Status

Instructions: To go to a specific Part, click a link above. Otherwise, click NEXT to proceed to Part 1.

QUIT Topic 1: RFMSS Overview JUMP TO PAGE INDEX NEXT


Page 1 of 1

Figure 17. Parts of RFMSS system.

Overall the most salient item addressed within this part of the tutorial is Topic 2 "MIMs." As illustrated in Figure 18, MIMs are an integral part of the ATTACC calculations.

USACE Geospatial Data & Systems Computer Based Training

What is a MIM?



ATTACC Methodology
Training Load

MIM = Maneuver Impact Mile
 ✓ Standard Unit of Measurement for TL
 ✓ One M1A1/2 Mile in Armor Bn FTX

MIMs = MILES * VOF * VCF * VSF * ESF * DAYS

Standard Vehicle	VOF = VEHICLE OFF ROAD FACTOR	Standard Event
M1A1/2	VCF = VEHICLE CONVERSION FACTOR	Armor Bn FTX
	VSF = VEHICLE SEVERITY FACTOR	
	ESF = EVENT SEVERITY FACTOR	

Training Support: the Army's Advantage

Topic 2: Understanding MIMs
Page 2 of 4

QUIT JUMP TO PAGE INDEX PREV NEXT

Figure 18. MIM screen.

In addition to pop-up menus and definitions, the tutorial incorporates weblinks to commonly used Army sites (Figure 19).

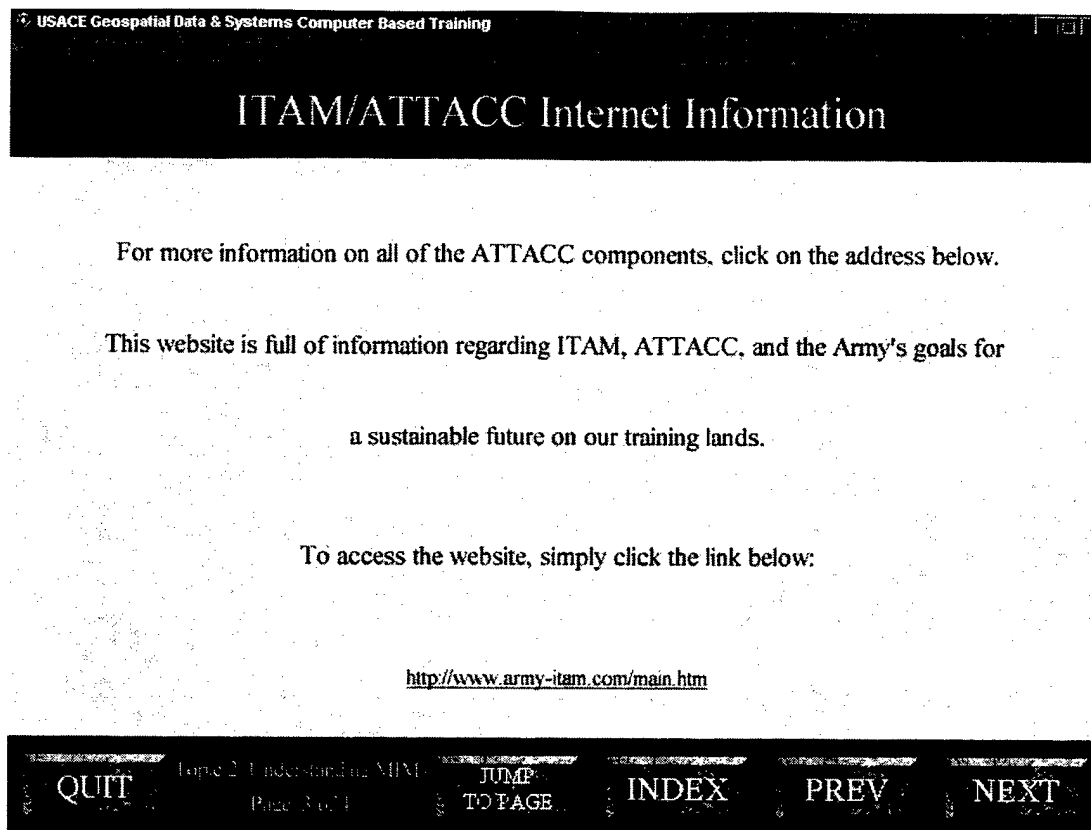


Figure 19. Weblink screen for additional help.

Section 4, as seen in Figure 20, briefly covers the ATTACC Integration Module (AIM).

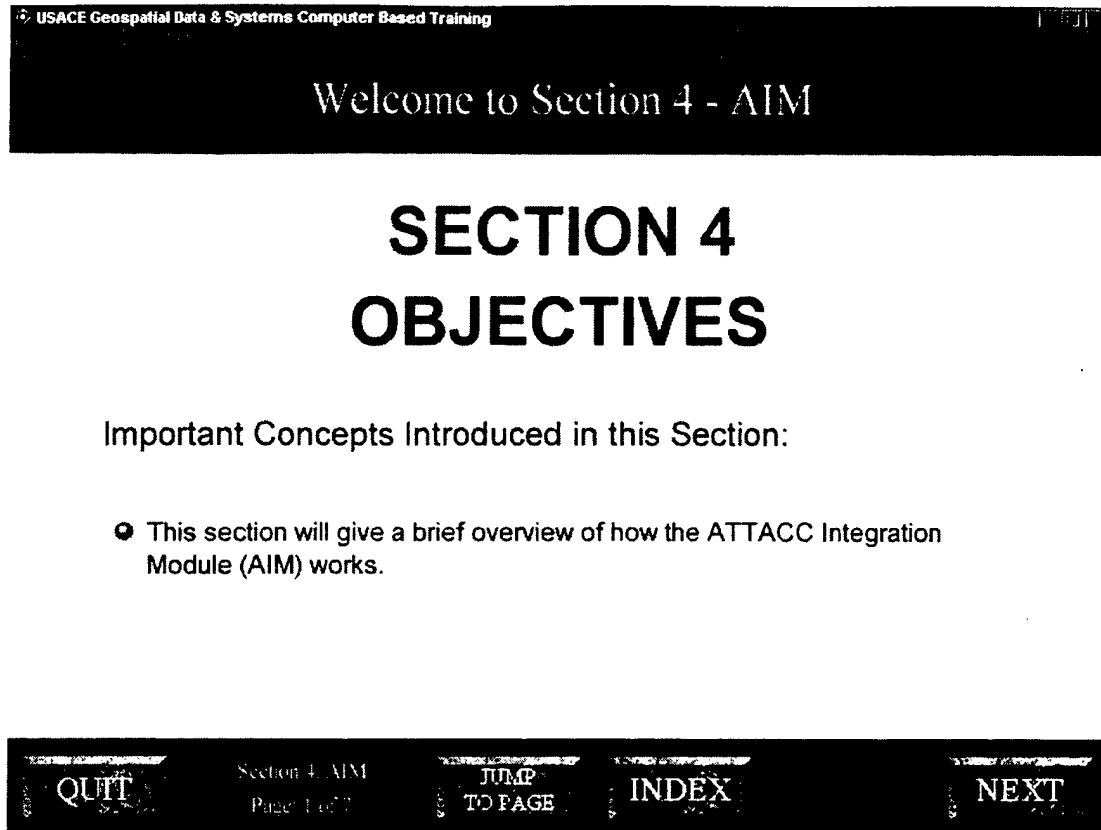



Figure 20. AIM screen.

AIM integrates all components of the ATTACC system (Figures 21, 22, and 23). It takes into consideration the LCM and MIMs to establish required data to be used in the Workplan Analysis Module (WAM).

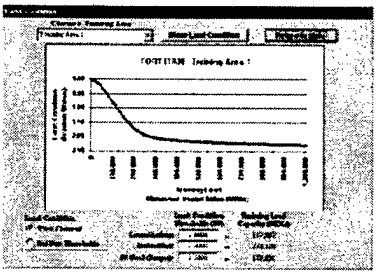
USACE Geospatial Data & Systems Computer Based Training

How do we load or analyze the information required?



AIM Screen

Land Condition



- Coordinator inputs land condition data sets from LCM
- Coordinator sets Green/Amber, Amber/Red, and Target land condition thresholds
- MIM thresholds are automatically entered on the training load screen

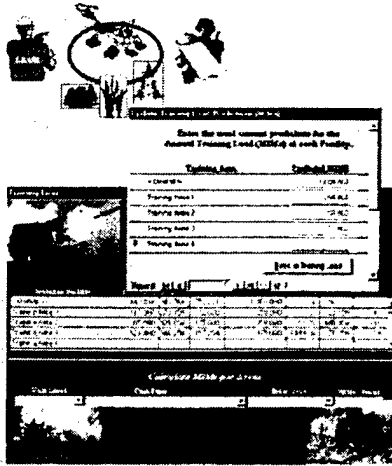
Training Support - the Army's Advantage

QUIT
See on 1 AIM Page 1 of 7
JUMP TO PAGE
INDEX
PREV
NEXT

Figure 21. AIM Land Condition screen example.

USACE Geospatial Data & Systems Computer Based Training

How are MIMs handled in AIM?



AIM Screen
Training Load

- ITAM Coordinator manually enters annual MIMs from RFMSS
- AIM compares MIMs thresholds & the MIMs goal to annual MIMs from RFMSS
- AIM also provides MIMs by type unit and type event for what-if scenarios

Training Support - the Army's Advantage

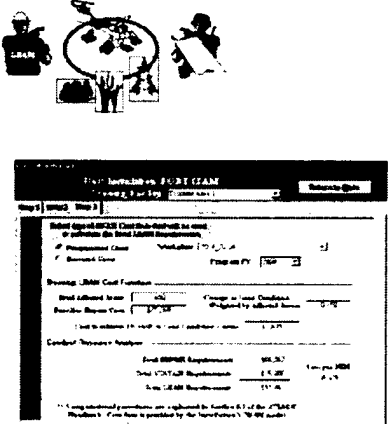
Section 4: AIM Page 3 of 7

QUIT JUMP TO PAGE INDEX PREV NEXT

Figure 22. AIM Training Load screen example.

USACE Geospatial Data & Systems Computer Based Training

How are LRAM requirements generated?



AIM Screen
Land Maintenance

- AIM calculates the total LRAM funding requirement. (Step 3)
- \$/MIM is calculated for use in RFMSS
- AIM automatically links to IWAM LRAM projects & their associated costs

Training Support - the Army's Advantage

Section 4: AIM Page 7 of 7

QUIT JUMP TO PAGE INDEX PREV NEXT

Figure 23. AIM Land Maintenance screen example.

References

- Anderson, A.B., and P. Sydelko. 1999. *Developing Land Condition Curves for the ATTACC Model*. Construction Engineering Research Laboratory (CERL) TR 99/67, Champaign, IL. Limited distribution; contact U.S. Army Environmental Center, ATTN: SFIM-AEC-ECN; Aberdeen Proving Ground, MD 21010-5401.
- U.S. Army Environmental Center. 1999. "U.S. Army Training and Testing Area Carrying Capacity (ATTACC), Handbook for Installations." Version 1.0. This document and related information about ATTACC are available through the Integrated Training Area Management website at www.army-itam.com.

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14. ABSTRACT

The Army Training and Testing Area Carrying Capacity (ATTACC) methodology is the Integrated Training Area Management (ITAM) standard for estimating training land carrying capacity by relating training load, land condition, and land maintenance practices. Various decision support tools have been developed to simplify and automate the ATTACC methodology.

The objective of this work was to develop an interactive computer-based training program for users of the ATTACC decision support tools. This software manual documents the development of the ATTACC tutorial program.

Authorware 5.1, which uses object-oriented programming, was used in the development of this tutorial.

15. SUBJECT TERMS

Army Training and Testing Area Carrying Capacity (ATTACC), computer-based training, Integrated Training Area Mangement (ITAM), military training, land management

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